

THE TEXTILE WORLD RECORD
KINK BOOKS

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Kinks for Knitters

No. 3

LORD & NAGLE COMPANY

Publishers

Boston, Mass., U. S. A.

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THE PHILADELPHIA TEXTILE MACHINERY COMPANY
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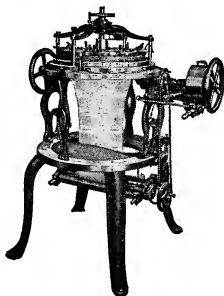
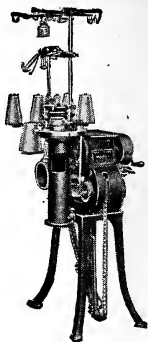
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THE TEXTILE WORLD RECORD
KINK BOOKS

Kinks for Knitters

No. 3

From the
QUESTIONS AND ANSWERS DEPARTMENT
of the
TEXTILE WORLD RECORD
Compiled by
CLARENCE HUTTON

[illegible]

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PREFACE

The success which attended the publication of *Kinks for Knitters*, *Cost Finding in Knitting Mills*, *Kinks for Knitters No. 2*, and *Hosiery and Knit Goods Bleaching, Dyeing and Finishing*, large editions of the first three having been exhausted, has led us to compile this book of practical experiences in knit goods manufacturing.

The editors of the *Textile World Record* are at all times face to face with the problem of securing practical information. For years its subscribers have been invited to make free use of its columns in asking questions relating to textile manufacturing, and it occurred to us that if some of the most important and most interesting of the practical questions that have been answered were gathered together in a handy form for quick reference it would meet a widespread want.

This book contains information which has been supplied by manufacturers, superintendents and overseers from their private record books and their stores of knowledge gained by experience. Many questions are answered and much information given, but subscribers should remember that if there is any information they desire which is not given in this volume, it is their privilege to ask the Questions

and Answers Department of the Textile World Record and every effort will be made to publish the information they want, provided the question is one of general interest to the trade.

No effort has been made to group the questions and answers relating to similar operations in any part of the book. The index has been carefully prepared, however, and its use should enable anyone to secure the information he seeks in the shortest possible time.

Grateful acknowledgment is due to the men who have supplied the information and if "Kinks for Knitters No. 3" should benefit any of the large number of men for whom it is intended, both they and the publishers will feel that its mission has been accomplished.

TEXTILE WORLD RECORD,

Lord & Nagle Company.

Publishers.

Kinks for Knitters

Knitting Artificial Silk

Please give me information regarding the running of artificial silk on a hosiery frame. Is there any way of softening the yarn? What is the best way to run this kind of yarn for making hosiery? Calais (2164).

I would suggest that "Calais" get his silk on small cones and have his machines fitted with stop motions. In knitting this class of stock it is also necessary to have a slight tension on the yarn. The knots in the silk play an important part in the knitting as the cones are all universal wound and almost every knot catches the yarn and as it is hard and of a woody nature will break the end every time unless a stop motion is used to offset the breaking. He will also find it necessary to run machines slower than on cotton or spun or thrown silk. I have made knitted scarfs of the stockinet pattern which is practically the same fabric and found considerable trouble until adopting the above measures.

As for a softener, there is nothing better that I found than running the silk over oiled pieces of cloth. There appears to be not so much trouble with the yarn itself as there is with the needles. The needles become dry and apparently a little roughed and the loops

seem to hang and tear and by oiling the yarn as stated above seems to be the only practical way of keeping the needles lubricated and perfectly smooth. It is also very necessary to watch needles for the least roughness of latch or rivet, as each little roughness will show a woolly streak or wale in the fabric.

Cipango.

Production and Costs in Manufacturing Union and Two Piece Suits

Please inform me how the production of union suits is supposed to compare with that of two piece goods. Some mills estimate that one dozen suits are equal to two dozen two-piece goods. Please let me know if this is right.

Palmer (2435).

It has been claimed by men well up in the trade that the difference would be as two to one, two union suits to one each of pants and vests. It has even been said that the showing would be even better than two to one. When the time spent on one dozen ladies' pants, against a dozen of the same size union suits is considered, the difference will be understood. The difference will be more on the better grades where hand made bands are put on. The difference in prices paid is also quite noticeable; that is, 24 cents for ladies' pants, 12 cents for vests, total 34 cents, while the price of a union suit is 17 to 20 cents. These prices are for finishing only. Prices vary according to style of finish or kind of band

used. Taking everything into consideration, I believe the comparative production under ordinary conditions should show better than two to one.

Trenton.

Keeping Track of Goods

Please give me a system for keeping track of knit goods as they go through a mill?

Manufacturer (2156).

No doubt "Manufacturer" when he states he wants a system for keeping track of goods as they go through the mill, means a system for locating goods on an order. The usual way is to have the work checks numbered consecutively. For example, John Smith & Co.'s order for 100 dozen came in on January 1st and happened to be the first one picked up on that date. The girl that stamps the checks will stamp all the one hundred checks of various sizes wanted, No. 1. Other orders will follow as No. 2, 3, 4, etc., until the end of the year. The cutters tie these checks to the dozens, cutting off the cutters' coupon attached. The goods are now ready to start through the mill, each operator cutting off a coupon that corresponds with her work, until the last coupon is reached, which the folder cuts off. It is a comparatively easy matter to follow this system and rush or stop goods as required.

Trenton.

Estimating Cost of Hosiery

I would like to have an explanation as to how the cost of hosiery is estimated in a mill buying the yarn. Knitter (2209).

It is usually the custom for a manufacturer starting in business, especially the manufacturing business, to inquire of some practical man how he figures his cost. This is an important point. In hosiery manufacture the first question is, what will the yarn cost? All yarns are as a rule quoted f. o. b. destination, consequently there is no freight to be added. Under head of mill expenses are included heat, light, rent, interest on capital, insurance, stationery, office help, salaries, fixed wages, repairs, etc. This expense will vary according to the production and locality. Following are the items of cost:

- Yarn, weight per dozen,
- Waste,
- Knitting,
- Inspecting,
- Mending,
- Looping,
- Dyeing,
- Boarding and pressing,
- Pairing, folding, stamping and boxing,
- Paper boxes,
- Seconds,
- Mill expenses,
- Packing cases,

Commissions,
Discounts,

Such items as knitting, looping, inspecting, mending, pairing and folding are usually piece work and paid by the dozen. The price varies according to location and competition, and prices will have to be arranged as conditions demand. Garhwal.

Eliminating Unnecessary Work in the Sewing Room

BY HAWICK

When going through the sewing room some weeks ago I noticed there was considerable time lost because some of the operatives had the habit of leaving their places. The shipping and stock room was on the first floor, as were the presses and packing tables, while the second and third floors were occupied by the sewing rooms. We had cut holes in the floor at the ends of the sewing rooms and lined them with smooth boards, making chutes through which the work was dropped to the pressing and packing room. Some of the garments would be finished at the center of the room and the finished product would have to be carried, sometimes ten to twenty yards to these chutes. This caused a waste of time and also encouraged the operatives to stop and talk on the way back to their machines. I hired a boy to carry this work, but as this

did not keep him busy, he also lost a lot of time.

I finally decided to arrange some kind of a carrier. On each end of two pieces of shafting we put wooden pulleys about 10 inches in diameter. On these pulleys we nailed thin boards, as shown at Fig. 1. A is the upright shaft holder; B, boards nailed to wooden pulleys; C, bed made of heavy

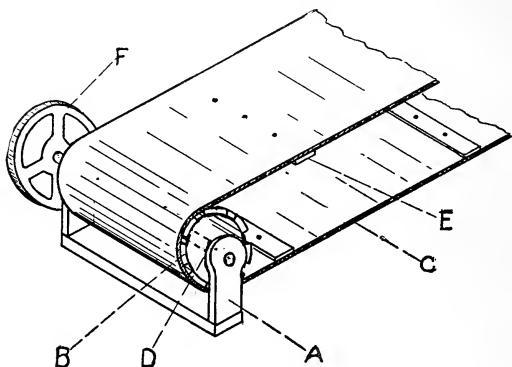


Figure 1

canvas; D, wooden pulley; E, showing manner of holding belt together; F, showing pulley by which the belt is run. This formed a wooden pulley 17 inches wide and 10 inches in diameter. We then placed these pulleys in upright hangers at each end of the machine tables and made a belt by taking heavy canvas duck 24 inches wide and doubling each

side under so that it would meet in the middle on the under side. This was held in place by rivets and thin boards on the top side. The belt was then made to revolve by placing a pulley, F, Fig. 1, and running a belt from the machine shafting. This belt or carrier has proved very serviceable and revolves when the machines are running. It has saved a great deal of time.

Duplicating a Sweater Fabric

We are enclosing two swatches of sweater cloth. We wish to imitate as nearly as possible the blue swatch, but have not been able to do so. The grey swatch is made on a 14-inch machine with 156 needles, with the head set as far ahead as possible with a long draw on the dial needles of about $1/8$ inch, the cylinder needles raised as high as practical and the whole weight of the cloth and stitch being on the dials. This was made on a Snyder machine, especially cammed for sweater work. Can you give us any information as to what kind of a machine the blue swatch was made on, or if it is possible to copy it on the machine we have described? You will note that the grey sample is not as firm between the wales as the blue one, nor does the stitch seem to lay out as wide on the wales. This was made of $2/6$ s cotton fed into the guide double, which would equal a No. 3 yarn and on the tuck feeds we used two ends of $2/20$ s worsted.

Knitter (2352).

After examining the samples carefully I find that by using two ends of $1/5$ s cotton on both feeds, which I think the blue swatch is made

of, you will be able to duplicate the fabric on a Snyder machine. I would advise drawing a slightly longer tuck stitch and tighten a little on the dial stitch. A very good duplicate of the sample could be made on the Leighton sweater machine by using four ends of 1/5s cotton.

Hawick.

Standard Measurements For Hosiery

Please give the standard lengths for misses' hose and men's half hose. Knitter (2460).

The length of misses' hose should be three times the size of the foot. In some instances the standard manufacturers vary this one inch. In other words, a 9-inch hose for misses should measure 26 to 27 inches. Many manufacturers do not have machines to make every individual size of children's or misses' hose. They have machines that make even sizes and they board out the uneven sizes. The consequence is that the length of 5 and 5 1/2, for example, might be the same.

The standard measurements for half hose are as follows:

8 and 8 1/2 in. foot has a 6 1/2 inch body.

9 inch foot has a 7 inch body.

9 1/2 and 10 inch foot has a 7 1/2 inch body.

10 1/2 and 11 inch foot has a 8 1/2 inch body.

11 1/2 inch foot has a 9 inch body.

The rib top on all sizes should be the same,
5 1/2 inches.

Ardmore.

Hosiery Sizes

Please advise us the standard length of the foot in ladies' hose from size 8 to 10, and in men's half hose from size 9 1/2 to 11 1/2 inclusive. Also advise us if measuring from the top of the reinforcement yarn in the heel to the top of the toe is the correct way to measure hose.

Saxon (2350).

The standard length of the foot in both women's and men's hosiery is in inches, just as indicated by the size. For instance, size 8 1/2 should measure 8 1/2 inches and 9 1/2 should measure 9 1/2 inches. The manner of measuring is as follows:

On seamless goods measure from the point on a line with the continuation of the heel seam to the point on a line with the continuation of the toe seam. On fashioned goods, measure from the end of the seam on the bottom of the heel to the top of the toe. The standard leg lengths of women's hose are as follows: No. 8, 26 in.; 8 1/2, 26 1/2 in.; 9, 27 in.; 9 1/2, 27 1/2 in.; 10, 28 in.

Filmore.

Percentage of Seconds in Manufacturing Union Suits

What is the average percentage of seconds in manufacturing union suits from spring and latch needle cloth among the better mills? We cut up all of our cloth regardless of holes and sew the holes up for seconds.

Clayton (2244).

We referred this question to a number of the leading knitting mills making union suits and have received the following replies:

No. 1. We cannot say definitely what would be a fair allowance for seconds in manufacturing union suits. Much depends on the quality of the stock, method of handling, also the standard of quality of the finished product. Part of our production is made on what is known as automatic tuck stitch machinery. In this department the average is about 6 per cent. of seconds. The part of our production made from 1 and 1, or plain stitch goods shows an average less than one-half of 1 per cent. of seconds.

No. 2. We have not had any experience in making up goods by cutting the cloth regardless of holes. It has been my experience for many years that the most economical plan is to have careful cutters who will cut the cloth, turning the holes to advantage in the different parts of the garment where they could be worked in. We could not say what the average percentage of seconds would be with the method of cutting described. We do not make union suits for men and women, our product being confined entirely to children's goods. We would consider in this class of goods from 3 to 5 per cent. about the average, depending of course on the quality of the yarn and class of goods running. Bleached white goods will make a larger percentage of seconds than unbleached.

No. 3. The seconds in manufacturing in both our mills averaged one-half of one per cent. for the year 1913.

No. 4. We would say that one per cent., that is one dozen suits out of every hundred dozen manufactured, is the limit that any manufacturer should permit to be made into seconds. There is no good reason for making more than this. To get this result it is necessary to have good yarn, good knitting, careful bleaching and dyeing and extra good cutting. "Clayton" states that he cut up his cloth regardless of holes and then sews up the holes for seconds. We think more seconds will result from this method than when the cutter inspects each length before it is cut. If holes cannot be turned out it may prove to be a good practice to cut off a short length containing the holes and use this short length for gussets and shoulder straps. This will increase the cost for cutting, but the saving in seconds will more than cover this extra cost. A few seconds are made in the dye house and the finishing room, but with proper care they should not amount to more than one-tenth of one per cent.

No. 5. If the holes could be cut out there would be about 4 or 5 per cent. of seconds, but when cutting without regard to holes the number of seconds depends entirely upon how the cloth is running, and 10 per cent. might not be excessive.

No. 6. We inspect our fabric before cutting and eliminate most of the seconds in that way. Our percentage of cutting waste under these conditions is about 12 per cent., but this includes the legitimate cutting waste as well as defective fabric. Our percentage of seconds in finished garments is very small. We have no figures at hand, but it is considerably less than 1 per cent.

Oiling Yarn

What is the most approved method of oiling the yarn before knitting? We have tried paraffining by hand, but it is too slow. We have tried oiling it with liquid petroleum and found it gave satisfaction when we could get it on the yarn with any degree of uniformity. We used sight feed oil cups which dripped on to a sponge over which the yarn ran on the spooling machine. We found this satisfactory up to a certain point. The sponge would wear out and get clogged with dirt and we could not depend on the operators to keep the oil regulated properly. Is there no attachment for winders for oiling or waxing yarn in a satisfactory manner? Hastings (1288).

A good method of oiling is that of running the yarn over a roll which revolves slowly in a trough containing emulsion. The speed of the roll as related to the linear speed of the yarn, the size of the roll, the length of the yarn in contact with the angle of contact and also the height of emulsion in the trough are all determining factors as regards the

moistening of the yarn. Jacob K. Altemus of Philadelphia makes automatic paraffine waxing attachments for winders. The proper conditioning of the yarn is very important and the amount of moisture to be used should be determined by careful experiments. Undoubtedly one of the reasons why American made goods do not have the soft finish of the imported is because we do not often soften our yarns before knitting. No amount of labor in finishing will ever even the lengths of stitches which have been unevenly drawn in knitting.

Elibank.

Uneven Lengths in Ladies' Hosiery

We are making ladies' hosiery from peeler and mercerized yarns and are having trouble in getting the length of the stockings uniform. Is this variation caused in the knitting process or to uneven shrinkage in dyeing.

Halifax (2149).

Uneven lengths of ladies' hosiery can be caused by a number of things. In the first place the cause may be the cutting from the machine. Again it may be trimming too much off after turning the welt. I would suggest that "Halifax" get one machine right and use a weaver's pick glass to get all the other machines to make the same number of stitches to the inch. Then have the same number of links in all parts of the chain. After doing this there should be no reason for

variation other than the slight variation in the yarn. If the peeler goods are made on the same machine that is used for mercerized yarn and the same size yarn is used without changing the machine, it will be found that the peeler goods will shrink more than the mercerized goods.

Cipango.

How We Increased Our Floor Space

BY HAWICK

The cutting room in the mill where I was employed was probably 40 feet wide by 90 feet long. The building was rather old-fashioned, having a ceiling about 20 to 25 feet high. We had three large cutting tables in this room, but our business was rapidly increasing, and we soon needed additional room. It was impossible to enlarge the room so we found it necessary to utilize all the space we had. We tried several methods of rearrangement, but could not increase the floor space materially. We then tried to devise some plan whereby we could utilize some of the space overhead.

The building was built with heavy rafters and large posts supporting the roofs, so we decided to make a sort of hanging floor. This we did by getting some very heavy iron rods about 1 1/2 inches in diameter, with a loop at each end and about 12 feet long. We fastened these to the large rafters at intervals of four feet and in the center. They were fastened to the rafters with heavy bolts with a

washer and nut, holding them fast on the end. On the lower end of these rods we hung large rafters about 3 1/2 by 8 inches. These were pieced together so as to extend the length of the room. We fastened these rafters in the same way in which we had fastened the rods to the ceiling.

Holes were cut in the wall of the building and rafters were extended from these holes to meet the large rafter. These were also placed at intervals of about 4 feet and fastened by means of large spikes and were also hung by means of rods. We then had our framework complete and to this we nailed the flooring. This increased our floor space about one-half. At first we had a stairway going up to this hanging floor, but later built a runway or incline. The floor was approved by the building inspector and has been supporting several tons.

Comparative Yarn Table for Cotton, Spun Silk, Artificial Silk and Thrown Silk Yarns

The Sauquoit Silk Manufacturing Co., Philadelphia, Pa., has compiled the accompanying yarn table, showing the equivalent of denier sizes in yards per pound, dram sizes and cotton counts.

Cotton 2-ply, 3-ply and 4-ply has 1/2, 1/3 and 1/4 the number of hanks and yardage per pound, its counts and numbers indicate.

ARTIFICIAL SILK		THROWN SILK			Cotton and Spun Silk Singles 840 Yds. per hank	
Deniers	Yds. per lb.	Drams	Yds. per Lb. In Gum	Yds. per Lb. In Boll off	No.	Yds. per lb.
60	74,409	4½	56,889	75,852	90	75,600
70	63,779	5½	47,628	63,504	76	63,840
80	55,806	6½	41,796	55,728	66	55,440
90	49,606	6¾	37,236	49,648	60	50,400
100	44,645	7½	33,572	44,762	54	45,360
110	40,587	8½	30,568	40,757	48	40,320
120	37,204	9½	28,055	37,407	46	38,640
130	34,342	9¾	25,924	34,565	41	34,440
140	31,890	10¾	23,814	31,752	32	31,920
150	29,764	11½	22,260	29,680	35	29,400
160	27,903	12½	20,898	27,864	33	27,720
170	26,262	13	19,692	26,256	31	26,040
180	24,803	13¾	18,618	24,824	29	24,360
190	23,497	14½	17,655	23,540	28	23,520
200	22,323	15½	16,786	22,381	27	22,680
210	21,260	16	16,000	21,333	26	21,840
220	20,293	16¾	15,284	20,378	24	20,160
230	19,411	17½	14,628	19,504	23	19,320
240	18,602	18½	14,028	18,704	22	18,480
250	17,858	19	13,474	17,965	21	17,640
260	17,171	20	12,800	17,067	20	16,800
270	16,535	20¾	12,337	16,449		
280	15,945	21½	11,907	15,876	19	15,960
290	15,395	22	11,636	15,515	18	15,120
300	14,882	23	11,130	14,840		
310	14,401	23½	10,894	14,525	17	14,280
320	13,951	24½	10,449	13,932	16	13,440
330	13,529	25	10,240	13,653		
340	13,131	26	9,846	13,128		
350	12,756	26½	9,603	12,883	15	12,600
360	12,401	27½	9,309	12,412		
370	12,066	28½	8,983	11,977		
380	11,749	29	8,827	11,769	14	11,760
390	11,447	30	8,533	11,378		
400	11,161	30½	8,393	11,191	13	10,920
450	9,921	34½	7,421	9,894	12	10,080
500	8,929	38	6,737	8,983	11	9,240
550	8,117	42	6,095	8,127	10	8,400
600	7,441	46	5,565	7,420	9	7,560

For instance $2/10 = 4,200$ yards to the pound, $3/10 = 2,800$ yards.

Spun Silk in 2-ply, 3-ply, etc., has the number of hanks per pound, and yardage its count indicates.

For instance $10/1 = 8,400$ yards to pound, $10/2$ the same, etc.

Thrown Silk loses in dyeing, an average of 25 per cent., hence 1 pound or 16 ounces grey will give 12 ounces dyed, pure dye, making it necessary to add $33 \frac{1}{3}$ per cent. to the gum or grey yards per pound to obtain the dyed yardage per pound of 16 ounces.

46 drams 5,565 yards per gum pound, plus $33 \frac{1}{3}$ per cent. $(1,855) = 7,420$ yards per dyed pound.

An Improved Method of Making Solutions for Knitting Yarns

BY CARDIGAN

In order to get the best results in knitting yarn we moistened the wool yarn by running it over a roller which revolved in a trough partly filled with a solution of lard oil, soap, paraffine and water. This solution was made up by the bucketful and heated until it reached the boiling point. It was then boiled until smooth. This worked well for a while, but on some days we ran on cotton and did not have any use for the solution. On these days the buckets would stand around the room and catch all kinds of refuse, including

tobacco and pieces of yarn waste. This made the solution so dirty it was impossible to use it on white yarn and frequently we had to throw it away.

Finally we arranged a can in which to boil the solution. We cut a hole in an old water cooler and ran a steam pipe into it from the boiler. In this way we were able to prepare the mixture in larger quantities and could draw it off as we used it, thus preventing the accumulation of dirt and other refuse.

Dyeing Silk Hosiery

Please give us information regarding the best methods of matching the silk with the cotton or mercerized top in a silk hose. We are having trouble in getting a good match as well as an even dye. Monarch (2326).

The difficulty appears to be in failing to obtain an even shade on both the cotton and silk. The dyes suggested as having been used seem to be of the classes most employed for the purpose by dyers of these goods, but we think that it is not so much a matter of what firm supplied the dyes, as it is of experience or lack of skill in applying them. Dyeing stockings of this and similar bright shades to meet the demands of the current fashions for colors constitutes almost a trade by itself, and the writer has seen otherwise skilled silk dyers fail utterly to satisfy the demands of the mills.

To dye such shades, the dyes must be selected from the group of colors that will dye both fibers approximately the same shade from the one bath, and afterwards top with brilliant green crystals. The dyeing should be done as follows:

Prepare the bath with

10 lbs. Soap.

3 lbs. Soda.

60 lbs. Glauber's Salt.

The softest water only should be used. Boil the bath, and add the above items and the necessary amount of dyestuff as determined by laboratory tests, and dye for about one hour. This does not mean to keep the goods on the spring boil for the entire time. The cotton is dyed, less than the silk, but the cotton takes on color in the cooling bath, consequently the dyer must keep a close watch as to just how the dyes are doing their work in the kettle. It happens that shading is frequently necessary for this class of work, and the dyer must have at hand for instant use some few dyes that will dye one or the other of the fibers in the stockings. It is almost impossible for any colorist or dyer to make a combination of dyes that will dye silk and mercerized cotton mixtures identically the same shade.

After the body shade has been dyed, run the kettle off, give a rinse, and make up a fresh kettle with cold water, add a suitable amount of the basic green (brilliant green crystals)

and work the stockings in it for some time, and then gradually increase the temperature to 125° to 130° F. and continue working until the degree of brilliancy has been reached. Run off, and then give a light wash until no more color comes off.

Shading with the basic dyes requires that a small quantity of acetic acid should be used to ensure even results. Berwick.

Causes and Prevention of Seconds

BY TRENTON

The problem of keeping down seconds in a knitting mill is one on which many manufacturers have spent a lifetime and much money. The attempt to prevent seconds has sometimes cost more than the real loss in seconds. Seconds collect from a hundred causes, but the most important are oil spots, poor winding, bad knitting and mistakes. Cleanliness goes far to reduce the number of seconds. Oil spots always mean seconds, even with the so-called stainless oils, for even with the latter the goods will turn yellow in a month or two and will be returned by the buyer. This starts trouble, for no one can place the responsibility for an oil spot.

There is not much chance for oil spots around a winder, so we will take up the next step, the knitting frames. The careless oiling of a machine by letting the oil can drip, or putting perhaps too much oil around the bed

plate or cylinder ring, will cause the oil to drop through to the fabric below. Sometimes these drops get on the take-up rollers and leave a black spot at every revolution of the roller. The oil that drips from the can or any clean oil is the cause of future trouble. Black oil can be cut out at the cutting table. Oil spots also occur from other sources such as leaky bearings, elevators, sewing machines, oil cans and oily tables. A knitter who uses a leaking can over a valuable roll of goods in sight of a bright red "Cleanliness First" sign ought to be looking for another job a few minutes later. This also applies in the bleach house to a man who will squirt oil around an extractor in motion, the extractor having no protection from the spattered oil.

Operators of sewing machines also swell the list of seconds by flooding a machine or using the leaky tin oil can. Dirty or oily yarn streaks must be fought out with the spinner and if a perfect white garment of the better grades is wanted this will be a hard proposition.

Poor winding results in large bunched knots, loosely tied knots and spinners' waste. Keep the strippers closed. Otherwise the result will be bales and bunches in the goods. New ways of making seconds are constantly appearing. The most common cause is yarn that has twits, soft ends or uneven spots. All these defects mean holes. A tight fabric with poor

yarn, too long a draw on the dial stitch cams, tight or hard pull on the take-up, poor needles, worn cams or thread guides, guides too close to the needles, cut dials or cylinders, all tend to make seconds.

A knitting frame must be kept clean and all parts watched for defects. The old saying, "Good winding is half the knitting," does not apply in all cases. Do not let waste collect around the needles or in the yarn rack. Do not let an operator run too many machines. This might not seem important, but notice an operator that takes care of say eight large latch machines. When things seem to go bad, the machine does not get the necessary attention. The operator with six machines watches the work closely, has more time to look around and produces more work than the operator with eight machines, other things being equal.

It is essential to keep yarn on bobbins on a covered shelf out of reach of the floor dust and dirt. Do not let the rolls or skeins of knitted cloth get on the floor. Have the cutters call attention to all the imperfect rolls. This might get tiresome for a time, but it helps in the end. Make a note of all these imperfections and get after them. It will be surprising how soon the cutters stop calling up the knitter to look at bad rolls.

A mistake in a knitting mill, from a winder who mixes the yarns to the buttonhole opera-

tor who makes a buttonhole upside down, means a second. A knitter puts up the wrong yarn, seconds; the cutter gets a certain size too short, seconds. Seamers get sleeves in crooked, or take off too much, seconds. Finishers run crooked lines, operators put lace on wrong, or a different style than called for, seconds. Button-hole, button sewers, tape girls, inspectors may cause seconds. A bad needle in knitting, a finished garment caught in a sewing machine belt, a drop of stamping ink, or a drop of paste in the shipping room may make a second at the last process. How to prevent seconds: Fight them, fight the leaky oil can, dirty floors and walls, cloth bins, stock rooms, careless help. "Cleanliness First" will help the fight.

Ridgy Effect in Knit Goods

On a 16-gauge spring needle machine having four feeders, using 23 1/2 grain yarn (basis 20 yards) what variation in the yarn would there have to be to make the cloth look ridgy? Would two grains either way do it?

Robson (2152).

The variation of yarn in weight, two grains either lighter or heavier, if the yarn was evenly spun from good carding, would not make the knitted cloth look ridgy or uneven; it would only make the cloth heavier or lighter in the weight of the finished garment. Not only would a much greater variation than that be necessary to make the cloth ridgy, but the

yarn on each one of the four feeds would have to vary in size.

Ridgy or uneven knitting is generally caused by uneven or badly spun yarn, which is sometimes due to the stock used. Variations in the weight of well carded and evenly spun yarn will not cause ridgy knit cloth.

F. W. Herington.

I would first suggest that "Robson" go over the stitch wheel very carefully and see that they are all set at the same angle and landing the yarn at the same height in the needles. Also see that the springs which hold the wheel in place are alike and do not let the tension on the yarn pull them out when the machine is running. If these wheels are not set as they should be, ridgy cloth will be the result. This is also true of the landing wheels as they should land the stitch to the pressers in the same spot on all four feeds. Then look over the cast off wheels and see that each stitch is being cast off alike. If these details are all carefully looked after there should be no trouble with ridgy cloth unless the yarn is uneven. A variation of one or two grains either way would make uneven cloth. Uneven twist in the yarn would also cause the trouble. I would suggest that "Robson" take off three feeds from the machine and run only one for one or two yards of cloth. This ought to tell whether the trouble is the result of uneven yarn.

Delmar.

Holes in Knit Fabric

I am enclosing a sample of knit fabric which contains a number of holes. These do not come very often. The yarn is knit on a 7-inch striper. I have changed parts of the machine, but the holes still appear. Can you suggest a remedy?
Essex (2395).

I have carefully examined the white mercerized knit fabric and have concluded that the yarn was burnt in bleaching. This often happens in bleaching white cotton and mercerized yarn and it will not show up until the yarn is used in knitting. It usually comes in ends of yarn mixed through the cones. It is only a short time ago that I had the same trouble with a case of 2/12s white cotton. The yarn proved worthless and the longer it stood the worse it got. We finally had to throw it away. The bleacher said the fault was in the stock used and the yarn man said it was the bleacher's fault, so we let it go at that and got our yarn from another source.

I have no machine here to test the yarn, but would offer a few suggestions: First, have the knitter look over the needles and see that they are all milled the same, that the latch and spoon are all smooth. If he finds them all right, then look at the machine and see if the dial is running true and not swaying, as this will make holes in tender yarn. Be sure that the cylinders and dial needles are evenly divided and that the edges are not rough, as this will cause cutting. See that the cylinder

draw-down cam is ground to the right degree so that the needles will not rob one another when forming the stitch. Also see that the draw-down cam does not hold down more than two needles before beginning to release same.

After getting these parts all right look to the dial draw-back cam and see that the dial and cylinder needles are set so they will not draw back together. The dial should be set one or two needles ahead of the cylinder needles. Look to the yarn guide and see that the yarn is going into the needles free and at the right point. Last, but not least, see that the take-up is perfectly clean and that the machine is working right. If all these details are attended to and the holes still appear, then the yarn must be at fault.

Bristol.

Knitting Silk

I would like to get some information on running 3/20s silk on a circular latch needle machine, cut 12 needles to the inch. I am running this now with a strong tension on the threads, but it does not work very satisfactory. I would like to know if this can be run with a tension and have it so there will be elasticity to it. This is run with 8 ends on an 8 feed machine.

Maurice (2263).

In knitting silk there are numerous difficulties to overcome which do not confront a knitter when knitting cotton or wool. To obtain the best results the dial should be adjusted so

that the dial needles are about $1/16$ inch above the top of the cylinder and the stitch cam on the dial needles adjusted to make the needles draw in about $1/16$ inch from the edge of the dial. Make the stitch on the cylinder needles about 6 to the quarter inch, and if the yarn stand is about four feet high, enough tension is given to silk by the time it travels up to the top guide and back down again to the needles. Have a fairly good weight on the take-up rollers to pull the fabric quite tight and then as a rather loose stitch is being made the fabric will shrink back about half an inch to every six inches of cloth. It will be necessary to make the article so much longer to allow for shrinkage, but when it has shrunk back it will be found quite elastic. If it appears too loose tighten on the cylinder needles. It is not advisable to lower the dial in order to make the fabric tighter and more elasticity is imparted by not making the fabric too tight.

It is a good plan to use lard oil on a piece of felt or cloth when running silk on a latch needle circular machine. Put this on the machine not too close to the needles so that the silk will pass over the oily cloth very lightly, receiving enough oil to make it run well without showing any stains. "Maurice" may be using a cylinder needle machine with sinkers to cast off the stitch. In this case it is not advisable to have too much tension on the silk. Use lard oil and not too tight a stitch. If the

lard oil does not make a good fabric without any weight, use weights until a difference can be noticed. Cleburne.

Size of Yarn for Gauges

What sizes of yarn are best suited for 4, 5, 6, 7 and 8 gauge work on the Edward Dubied flat knitting machine? Please state the correct size for each gauge. Calgary (2157).

We referred this question to E. O. Spindler, 350 Broadway, New York, an importer of knitting machines, who replies as follows:

The correct sizes for the different gauges are as follows:

For machines with 4 needles per inch 4-ply 12s worsted.

For machines with 5 needles per inch 4-ply 16s worsted.

For machines with 6 needles per inch 3-ply 19s worsted.

For machines with 7 and 8 needles per inch to 3-ply 21s worsted.

These are the counts as they should be used for the respective gauges. Manufacturers disagree, however, quite frequently and I know cases, for example, where people knit 2-ply 18 on five cut machines.

Cost Table for Manufacturing Sweaters

Please give us a cost table for manufacturing men's sweaters, using a basis of 4/20s quarter blood worsted yarn, working with

power machines on the body and hand power on sleeves. Grosier (2048).

I can give only outline table for manufacturing men's sweaters, as the cost for various items varies in different parts of the country. In a mill with a capacity of 12 dozen per week of shaker coats, the overhead or fixed charges would be about 30 per cent. of the selling price, which, added to the cost of manufacturing, gives the cost of the goods. These overhead or fixed charges include all salaries and wages, general expenses, repairs, power, light and incidentals, trade discounts, etc. For an example I will take a size 40 sweater coat knit from 4/20 worsted weighing 18 pounds per dozen.

18 lbs. of 4/20 yarn at 85c. per lb.	\$15.30
4 ozs. waste .....	.22
Winding 18 lbs. at 1c. ....	.18
Knitting sleeves, per doz. ....	.75
Knitting bodies, per doz. ....	.50
Knitting cuffs, per doz. ....	.20
Knitting pockets, per doz. ....	.25
Knitting trimming, per doz. ....	.15
Hand finishing	1.35
Mending .....	.25
Sewing on trimming on machines ....	.35
Sewing on buttons on machines ....	.25
Making button holes on machines ....	.25
Boxes	1.00
Buttons	1.00

Thread .....	.15
Folding and packing .....	.05
<hr/>	
Total	\$22.20

I note the question of "Grosier" (2048) and the reply in the August issue. The figures may be right for shaker goods, but not for a regular line. I give herewith a statement of cost as we calculate it, based on an average production of 150 doz. per week, using 5-gauge Grosser power machines, knitting bodies, trim, and pockets, and Grosser hand machines with a good knitter making full fashioned sleeves with cuff.

I take your estimate of 18 lbs. for a garment and allow 1/2 lb. for waste, which I find is an average:

18 lbs. 1/4 blood worsted at 85c.	\$15.30
1/2 lb. waste .....	.48
Winding at 2c. ....	.37
Knit bodies, trim and pockets .....	.40
Knit sleeves fashioned .....	.75
All sewing machine operations	1.25
Mending examination, folding .....	.25
Boxes .....	.36
Buttons 1/2 gross .....	.63
Packing .....	.05
Shooks, 12 doz. cases .....	.10
<hr/>	
	\$19.94

An allowance of 10 per cent. of the selling cost is made to cover all overhead charges. We include as expense items thread, facing, labels, etc., but do not include trade discounts nor selling costs, which are figured on the price per dozen of each style. I do not see how these items could be made as an overhead charge, as the cost price and selling price vary so much. Unless a mill is running on one style only and selling to one house only I do not understand how it would be possible to average the selling cost and make it an arbitrary overhead charge. Macbeth.

Prices Paid for Piece Work

Please explain how the prices paid for piece work on full fashioned knitting machines are determined. In our mill we are paying 35 cents per dozen on 39 gauge, 18 section boot leg silk, or a little less than 1 1/2 cents per stocking. The mill superintendent informed me that this price was paid because he could not secure help in any other way. It occurred to me that there must be some fair basis for calculating piece work prices on this machine and I would be glad to have you give me the information. Knitter (1939).

The knitting of full fashioned hosiery requires as highly skilled help as any textile work. The knitting of silk is the most difficult. Manufacturers must be absolutely sure that they have men who will help keep the machines in perfect condition. It has been our experience that about three out of ten of

those whom we have tried to teach in the last fifteen years have mastered the trade. We have been careful to start only those in good health, of good habits and having good eyesight. Those who had several years prior experience as helpers on half-hose leggers or on footers became the best knitters. Most of those whom we have taught have stayed with us. We have found that we must pay our men as much as they could get at other mills. Of course the cost of living, size and condition of machines and quality of silk used may safely be taken into account. Although conversant with the cotton system of knitting from the two section hand frames down to the big power frames of today, we have yet to learn of any basis for calculation other than that of mutual agreement between employer and employees.

Winwick.

Keeping Track of a Yarn Account

We are manufacturers of hosiery and would like information as to a good way to keep track of a yarn account. We always keep a record of what is received, what is used, and the amount used per dozen. If five hundred dozen are manufactured during a week we calculate accordingly. When the inventory is taken we are always short, which shows that more yarn is being used than we calculated. How do mills look after this?

Knitter (2090).

The shrinkage in the weight of the yarn received when compared with the weight of the

goods and waste is evidently due to the evaporation of the moisture in the yarn: Cotton yarn, during the process of carding and spinning, absorbs a large quantity of moisture; in fact it is necessary for the proper working of cotton to have considerable moisture in the rooms, which is obtained by the use of humidifiers. It will be found that when the yarn is received by the manufacturer, the weights are nearly, but not exactly correct. The yarn may have been subjected in transit to varying conditions of evaporation. For this reason it is difficult to keep an accurate account, the weights varying from 3 to 6 per cent.

A case of yarn is, for example, received from the spinner and the weight found to correspond with the amount on the invoice; another case may be stored in a warm place for say two or three weeks and then brought into the knitting room to be used. If it is weighed it would be found short in weight. If the case of yarn had been kept in a damp place, it would have gained in weight, and this increase would disappear in the winding and knitting. This is one reason why hosiery weighed as the goods come from the same machine during the day will vary in weight. On Monday morning in hot weather when the yarn has been exposed on bobbins over Sunday, it will be found that the goods will weigh less than those knit during the day from yarn just received from the spinners.

Take as another illustration, a roll of cloth for underwear which has been weighed as it comes from the knitting machine, then washed, dried and weighed again. It will be found to have lost from 5 to 7 per cent. in weight, as a result of the loss of the moisture in the yarn when the goods were weighed first. Owing to the variation in the loss of weight due to evaporation, the only accurate way to determine the cost of yarn used in the manufacture of a given quantity of goods is to keep track of the goods manufactured from a certain lot of yarn. This yarn should be wound and knit separately and a record made of the number of dozens obtained. In this way it will be easy to determine the quantity of yarn used per dozen and the cost of the same, allowance being made for the waste in knitting and winding. This system may not be practicable where many different weights of goods are made, but tests of this kind can be made on one or two styles in order to determine the loss.

Lafayette.

Number of Needles to the Inch

Please state what is the greatest number of latch needles to the inch. Avon (2356).

There are frames cut 16 to the inch. I have a few of them, but they have not been satisfactory. Fourteen latch needles to the inch is the greatest number I have known to work well.

Trenton.

Calculating Cost and Return on Increase in Plant

My employer has a greater demand for half hose than he can produce on the machines he has in operation. The rib frames, looping and finishing machinery is ample to take care of 60 dozen per day more than is being produced at the present time, but he is not inclined to invest any money in knitting machines. I am willing to install the knitters. How much per dozen would you suggest for the use of the machines? I will pay for the upkeep of the machines. It costs 35 cents per dozen to produce the hose ready for looping and they are sold for 72 1/2 cents per dozen finished.

Knitter (2379).

I cannot see how the employer could make it pay to rent machines in this way. It would be better to take "Knitter" into the business and give him stock corresponding to the value of the machines. This would be increasing the business, whereas the rental idea would be adding to the cost of production. If, however, the rental scheme is acceptable to both parties I would figure the charges per day on the following basis:

If one machine produces 3 dozen, 20 will produce 60 dozen.

Cost of 20 machines at \$100	\$2,000
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Depreciation, 5 per cent.	\$100
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Anticipated profit, 10 per cent.	200
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Fair return on investment	\$300
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Production, 52 weeks, 15,600 dozen.

15,600 dozen at 2c. would give a yearly

income of \$312

If by "upkeep" is meant paying a fixer, this cost should be added, but I suppose "Knitter" means depreciation which is covered.

Hoosier.

Manufacturing Knit Boots

Kindly give me as much information as possible regarding the enclosed knit boot (shown in the illustration), how it is made, on what kind of a machine, etc. Mackie (2265).

These goods are made on a cross cut circular latch needle machine driven by power on the cylindrical portion of the work and by hand on the heel and toe. The shaping is done by transferring the stitches by means of a hand rack. The toe is closed on the machine. The machine must be large enough to allow for the considerable shrinkage of the boot in the felting process. This shrinkage, of course, depends on the kind of material used. I understand that 3/4 automatic machines were used for making these boots some years ago, but the method I have described is employed by a number of up-to-date mills.

Ernest Tompkins.

The sample has been knit with a thick yarn spun out of a coarse wool of strong felting properties and it may readily be believed that

the thread structure is an advantage in felt intended for this purpose. The sample has been put before a firm which manufacture finishing machines and they see no obstacle in



the way of getting the desired amount of felting upon the fulling machine. A considerable amount of shrinkage would have to be allowed for and it would be necessary to make tests upon a measured area of fabric in order to arrive at the initial size of the boot.

J. Strand.

Determining the Gauge of a Knit Fabric

Can you inform me of any method known by which one can distinguish the cut of a machine or the number of needles to the inch by inspecting the fabric, that is, in latch needle work? I am sending a sample of goods recently made on a 11-cut machine, 36 gauge needles with a 42 hook and have been told by several it was made on a 12-cut machine.

Moscow (2308).

There is no known method, except experience, that I ever heard of, by which one can tell the cut of needles from a sample. The sample submitted looks to me like a 12 cut. There might be a difference between the 11 cut and the other frames in number of needles. In fact some 11 cut machines I know of come nearer being a 12 cut, owing to the variation in the standards of machine builders.

Trenton.

Shrinkage of Hosiery in Dyeing

Can you tell me what causes a shrinkage in length of hosiery dyed with a developed black? We allow for shrinkage, but after dyeing, the top is about two inches short. We have been troubled with this for a week or more and were wondering if there was anything in the water to cause the difficulty. The recipe we are using for this black we sent you a few days ago with the question regarding reddish shade.

Thornton (2258).

Cotton hosiery not only shrinks in length, but also in weight. The former shrinkage is

a mechanical condition only, and can be traced directly to the amount of take-up in the yarn due to its twist, which greatly influences the result. Some yarns take up more than others, and the only way to get at the cause is to measure carefully the knitted hosiery before and after dyeing by the developing process, and preferably from yarns of different counts.

As a rule, cotton loses in weight about 5 per cent., not including the natural moisture.

Shrinkage due entirely to the result of dyeing depends upon the number of operations through which the hosiery passes. As the developed black process consists of three baths, it is probable that the shrinkage will be greater than if the dyeing process consists of only one bath.

Berwick.

I do not see anything in the dyeing recipe that would cause the shrinkage in length. It is my opinion that the whole trouble lies in the increased twist in the knitting yarn. Have some of this twist taken out and I think "Thornton" will find the shrinkage will be reduced to a normal amount. Beta Naphthol.

Large Figures on Jersey Cloth

Can you give me any information regarding knitting machines for jersey or bathing suit cloth on which letters and figures can be knit into the goods?

Knitter (2309).

A flat fabric could be knit on a jacquard machine but this would leave floating threads on the inside of the garment which is impractical where such large figures or large letters are used. The old fashioned English hand knitting frame would produce such articles but this process is very slow and furthermore it is extremely difficult to secure help to operate these machines. The younger generation never became expert on these old hand frames and the old men who still work on them are gradually dying off.

It would seem as if the most practical solution would be to stitch on felt letters which have been previously cut or stamped out or you might be able to secure a few good hand finishers who would be able to use the stocking darning stitch for plaiting a colored letter on the top of the regular jersey garment. This could probably be done at a cost of about 25 cents a letter in sizes up to four or five inches high.

Max Nydegger.

Marking Knit Goods

If a heavy soft lead pencil is used to write on the cloth while the fabric is stretched over a board covered with coarse emery paper, the marks will not bleach out and there is no limit to what you can put on a roll. This method is clean and rapid. The marks will fade a little, but a heavy mark is easily read and anyone

who tries it will discard all stamps and be glad to get rid of the pad that it so liable to smear everything that it touches, fingers included.

We use an ordinary graphite pencil for marking our rolls and all that is necessary is to make the mark heavy enough. The emery board is used to hold the cloth as the mark will not penetrate unless the cloth is held firmly. It is so easy to mark rolls in this way that we mark every roll with the knitter's name and the machine width, all of which is very useful in the cutting room. I am under the impression that it is the carbon in both the coal tar and pencil mark that resists the bleaching process. The method differs only in the manner of applying it to the cloth.

Herkimer.

Dyeing of Cotton and Silk and Cotton and Artificial Silk Hosiery

BY KASHGAR

Artificial silk has gained a strong foothold in the manufacture of certain kinds of hosiery, especially such as is moderate in price, and made to meet a demand for something that is not expected to last too long. Cotton, plain or mercerized, and real silk, are also employed to a very large extent in the manufacture of a similar line of goods, but which, owing to the greater cost of the real silk, commands a somewhat higher price.

In the dyeing of these two classes of hosiery, it was formerly the safest plan to dye up each fiber to shade separately, and then knit the article, but the general custom now is to dye the stockings in bulk, and to control the dyeing operation in such a way that the various dyes used will go on the two different fibers at the same rate, thus giving the same shade.

Dyeing Cotton and Real Silk Mixtures

The stockings are generally made of real silk in the leg, but with mercerized cotton top, heel and toe. The silk is in the raw state and must be degummed in the usual manner with two soap baths, followed by a good rinse. The degumming is best done in bags, although some dyers prefer to carry out the operation in either the revolving stocking dyeing machine or loose in the tub. This latter method is not the best one to follow as there is, as a result, a number of stockings that are "seconds."

The best type of machine for dyeing these stockings is difficult to recommend, but perhaps the revolving cage machine is the one most frequently found in such dye houses. The choice of dyes is generally confined to either the substantive dyes—those dyeing cotton without any mordant—either alone or, as is commonly done, in combination with dyes of the acid group.

For certain shades it is found that the silk does not dye as full as the cotton, and the dyer is required to add some acid colors to bring up the shade of the silk to match that of the cotton. The process is to add to the dye bath the approximate amount of substantive dyestuffs necessary to give the depth of shade desired, and add about 20 pounds of crystal Glauber's salt, and dye for about one hour under the boil—usually $3/4$ hour at 190° F., is sufficient. During the dyeing note how the silk is coming up, and as it takes the substantive dyes less than the cotton, add a very small quantity of some acid color of the same shade as the cotton dye.

After the two fibers are about the same depth, complete the dyeing by adding 10 pounds of acetate of ammonia in crystals, then raise the temperature to 210° F., and continue the dyeing for 20 minutes longer. As a rule, the cotton and silk will be satisfactorily dyed if the dyer's choice of colors was judicious. Do not add the acetate of ammonia until the second half of the operation, and always bring the temperature afterwards to near the boil.

Certain modifications of the dyeing process are necessary for particular shades. A royal blue, for instance, is best dyed with the methylene blues, of which there are many good makes on the market. The stockings are immersed for 5 hours in as small a volume of bath as convenient, heated to 100° F., and containing 6 per cent. of tannic acid (on the

weight of the stockings), then squeeze and pass through a cold bath containing half as much antimony as of Tannic acid. Afterwards wash and dye. It is to be noted that the higher the temperature of the tannic acid bath, the deeper will be the shade of the silk, while if the temperature be allowed to go down, the cotton will show up deeper.

The dye bath is made up with about 1 3/4 lbs. of an ordinary good type of methylene blue, the dyeing being done with a small amount of acetic acid, not allowing the temperature to exceed 140° F.

The fashionable shade of emerald green on cotton and silk stockings is dyed exactly as for the royal blue, but dyeing before mordanting with a bright acid green shaded with a pinch of Indian yellow, then wash and mordant as previously described. Afterwards again dye at 110° F., but using basic dyes to produce the shade, usually a mixture of brilliant green crystal—a most common dye, and a basic yellow.

Dyeing Cotton and Artificial Silk

The process for dyeing this combination of fiber is not complicated. The dyes most generally employed being of the substantive group, but as artificial silk has a strong affinity for many of this class of dyes, they should be selected only after trial, and to adjust the dyeing process to reduce this dyeing affinity.

The dyeing temperature should be kept as low as possible, 140° F. being sufficiently high. As the exhaustion of the dye baths is incomplete, it is necessary to work with a pretty strong dye liquor, but this does not mean that strength is to be given by large additions of common salt, which would only tend to "salt-out" color at the expense of the dyeing.

As a rule, 10 per cent. of Glauber's salt is sufficient, with 1/2 to 1 per cent. of soda ash and 3 to 4 per cent. of Turkey red oil. Commence dyeing at 75° F., and gradually increase the heat to 140° F.

A peculiar condition is often experienced in dyeing full, heavy shades—the artificial silk taking up the color too strongly. To guard against this it is found an advantage to prepare the stockings by soaking for several hours in a tannic acid bath containing 10 to 12 per cent. of tannic acid, heated to 150° F., then transfer the goods to a bath containing 7 1/2 per cent. of tin crystals dissolved with the aid of a little muriatic acid, and finally rinse well. By this treatment the artificial silk is made to lose some of its affinity for the dyes, and the tendency for evenly colored stockings materially increased.

Bleaching Underwear

In bleaching white woollens with sulphur we find that rinsing after the bleaching in warm water to remove the sulphur smell gives the

goods a yellow cast. Could you give us some information as to how to avoid doing this? We use a hot air web dryer and cannot wait to air goods outside. Mansfield (2240).

When bleaching with sulphur dioxide if the treatment with the gas is followed by a repeated washing in hot water the goods naturally become yellower, as an oxidation of the material takes place. This can, however, be avoided if the washing in hot water be followed by a rapid treatment in a weak bath of ammonia or carbonate of soda. This neutralizes the sulphurous acid present in the wood and avoids to a great extent the formation of the yellow color. Umbria.

Defective Knitting

We are sending you a sample of knit goods made of No. 18 three-ply spun silk yarn. This swatch shows particular defects, forming a sort of oblong ring where the yarn seems to be finer. As the silk runs the long way in the swatch we cannot see how defective yarn could form a small circle from several layers of yarn. We wound some of this yarn, forming these rings, on a blackboard, but cannot find cut places in it where the rings were formed. Uneven yarn should show in the swatch thick and thin places in the same direction as the yarn is running, but not in the form of rings. We would like to have your opinion as to whether these rings are made from defective yarn or poor work on the knitting machine. Fairview (2458).

This fabric was made on a spring needle flat frame. The defect was caused by not

pressing hard enough to clear all needles, thereby holding more than one stitch on certain needles. Perhaps the needle plates are loose enough to allow play in the needles, in which case the presser bar will only press needles back instead of closing the beard.

Trenton.

Bleaching Silk Hosiery

Please send us a receipt for bleaching silk hosiery. We are at present bleaching mercerized and cotton hose with chloride of lime and having very good success in this line, but have some silk hose that we wish to bleach, and would thank you to give us a formula for same.

Elcot (2199).

Silk hose to be made ready for bleaching should be thoroughly cleansed with a light soap boil, care being taken that all soap is afterwards completely removed by a good wash. Successful bleaching can only be accomplished where the silk is clean. Silk may be bleached by different processes, the most common being either by the use of permanganate of potash and bisulphite of soda. It may also be bleached with either peroxide of hydrogen or peroxide of sodium.

The permanganate process was formerly very much used for bleaching all kinds of silk goods and when the details are given attention, the results are very good. The following quantities are for a small kettle holding sufficient water to accommodate 20 to 25 pounds

of silk hosiery. To such a bath dissolve 6 ounces of commercial permanganate of potassium and add 1/2 pound of Epsom salt. The hosiery is worked in this solution until the purple color is nearly removed and the silk has attained a full rich brown color. Lift, wash and work the brown hosiery in a fresh bath containing 6 ounces of a solution of bisulphite of soda standing at 71° Tw., together with 1/4 ounce of sulphuric acid, first diluted in a pint of water. Sometimes where the deposit of brown oxide of manganese is very heavy, a second passage through the bisulphite becomes necessary.

Bleaching with peroxide of hydrogen or peroxide of sodium is perhaps the best method for general use. Peroxide of hydrogen is used full strength (3 per cent.) as supplied by the chemical works. The silk is immersed in the solution in suitable wooden tanks without any iron or other metal in contact with the bleach solution. This solution must be made slightly alkaline with ammonia. Keep the silk well under the surface of the liquid, even if a wooden lattice is necessary. Let the bleaching proceed for six to ten hours or longer, over night is the usual practice, and in the morning, lift, squeeze to save the excess of liquor, rinse and finish.

If peroxide of sodium is used, it must be added to the bath in small portions at a time, first adding the necessary amount of sulphuric

acid. The following quantities are used for 25 pounds of silk hosiery:

- 60 gals. water,
- 5 lbs. sodium peroxide,
- 8 lbs. Epsom salt

The temperature of the bath may be gradually brought up to 180° F. if necessary, allowing the silk to remain immersed for 6 to 8 hours, afterwards lifting, washing and then carefully put on drying boards. Dumfries.

Bleaching Yarn

I am having considerable difficulty in securing as soft a bleach on cotton yarn for underwear as I require. The goods bleached by me knits up wider than that when bleached by an outside concern and also makes the garment appear to have been knit on a coarser gauge machine. Do you think this is due to the method of boiling preparatory to bleaching? Which is to be preferred, an open boil or a pressure boil? My yarn seems to possess a slight harshness or scroop which I am unable to detect in the yarn that comes in from the outside. I enclose a sample of knit goods bleached by my process and one bleached by an outside process. Both pieces were made from yarn bleached in the skein. I give the yarn a regular caustic boil at high pressure and use the slow method of bleaching. I know the pressure boil is superior to any other for many purposes, but I am inclined to think an open kier boiling is better for this kind of work. I use regular softener in the finishing. Do other bleachers get better results with something else? How can I increase the elasticity?

Landrum (2280).

The sample bleached by "Landrum" is quite harsh and this harshness is due to too much alkali either in the boil or in the finishing of the soap. If the yarn is taken from the dryer before it has time to thoroughly cool it will have a tendency to spoil the elasticity of the webbing.

Mohegan.

If "Landrum" will reduce the caustic by 2 per cent., make up with 3 per cent. of Soda Ash, add 1 1/2 per cent. of good castor oil soap, work the mixture 2 hours at 150° F., then bring to the boil and work 6 hours using a centrifugal pump for circulation and using bleaching liquor that has been treated with soda ash and sour off with muriatic acid, I am sure that he will get the yarn so that it will not have a harsh handle, but will feel much softer and fuller.

Parma.

Seaming Sweater Coats

Will you please advise us what is the best method for the seaming together of what is known as the Shaker sweater coat, also the Jumbo stitch sweater coat. We refer to the cuffs, collars, sleeves and sides.

Marcus (2277).

The majority of knitting mills are finishing their Shaker coats by hand, whereas for the seaming up of the sides of Jumbo stitch sweaters that are knit front and back separately, a special sweater overseamer may be used to

good advantage. Shaker coats are generally made without side seams. Some are using the sweater overseamer for the seaming-in of the border, having provided a firm edge by means of a Merrow machine to the body cut open in front.

The hemming is best done on a circular looper and the putting in of the sleeves on a flat bar looper.

Max Nydegger.

Streaks in Hosiery, Variation in Sizes and Number of Operatives Required

Enclosed is a sock manufactured of 2/32s combed peeler mercerized in the cuff, 2/40s in the body, 2/50s in the heel and toe and 1/60s in the splicing. We would like to know the reason for the streaked effect. Some of our people think it is caused in the mercerizing, while others claim that a running of the single thread with the double thread is bound to show a difference in the dyeing. Kindly advise us as to the real cause, also your opinion upon running single and double threads together in the same sock. We are also having considerable trouble in keeping our sizes even, as the machines set on one size start off in the morning and before noon they run from 1/2 to an inch larger. Kindly explain the cause of such a variation. Also inform us as to the number of machine men and helpers required to operate 14 Paxton & O'Neil plating machines, and 39 Mayo model A and model C machines, 14 Wildman ribbers and 10 record loopers.

Summit (2248).

I find that a plain 11sle yarn is used as reinforcing in heel and toe and a single soft yarn

as splicer. Yarn not mercerized will not take the same color in dyeing as a mercerized yarn. The process of mercerizing, especially the caustic bath, removes all vegetable oil and acts as a mordant by opening the fiber and making it more susceptible to the dye. To prove this put a common lisle stocking in with the mercerized lot when dyeing and the difference in color will be plainly noticed when finished. I think the trouble can be overcome by using mercerized cotton, and feel sure no trouble will arise with streaks except possibly in the splicing. I do not think a single yarn can get as much luster as a double yarn on account of not being able to stand the tension in the process. I understand that tension plays a very important part in adding to the luster.

I have never had any trouble with variations in size, except in winter, when in the morning the machines were cold and would knit tight and naturally make short goods, but they would get back to their normal state again as soon as they got warmed up and running smoothly. It is possible that the dog on the chain ratchet is skipping occasionally. This will cause the goods to be long. One operator, a girl, should run two knitters and do her own topping. Two good fixers should be able to handle the machines and keep them in repair. On ladies' goods, one operator should run from 10 to 15 knitting machines.

Cipango.

Blue Spots on Bleached Knit Goods

I enclose sample of our knit goods which are bleached in the roll by the peroxide process and which show numerous small blue spots scattered irregularly through the goods. We are having a great deal of trouble with these spots, nearly all of our goods showing more or less of them, and would like to have your opinion as to the cause of and remedy for the difficulty.

Nixon (2427).

I can think of nothing in connection with the peroxide bleaching process which would give such unfavorable results. I knew of an instance where similar trouble was encountered, and after careful investigation we found that it came from attempting to do the dyeing in close proximity to the bleaching. Apparently very small particles of dyestuff floating in the air would settle on the top of the liquid in the bleaching vats and cause spots such as appear in this sample. Separation of the processes put an end to the trouble. This might be worth while investigating.

Caliatūra.

The trouble which "Nixon" is experiencing is very peculiar, as the peroxide process is superior to the other processes in that there is less trouble from machinery and plant equipment. I assume from the inquiry that the trouble arises in the bleaching process, as "Nixon" does not state whether he is using a little blue after the bleach to heighten the color of the goods. If the spots are caused in the bleaching process it is evident that some-

thing comes in contact with the peroxide which acts as a soluble agent, and that the spots are then distributed through the goods.

I would advise "Nixon" to examine all parts of the vats to see that the connections are right. There may be a defect in some joint where a little graphite or some other substance is being dissolved by the peroxide and carried away by the liquid into the goods. Or it may be caused by the marking of the goods. Does "Nixon" use blue crayon for marking the rolls as they are brought from the machines? I have known this to be the cause of a lot of trouble, especially if they are the soft crayons, which is distributed between the threads to a greater or less degree according to the pressure used. This color is made soluble by the bleaching solution.

I would suggest finding out where the spots first appear. We at one time had a lot of trouble with spots appearing on our goods and upon investigation found that the dust and specks were falling from the floor above, which had been used for dyeing. After putting in a new floor the specks disappeared.

If this does not remedy the trouble I would advise "Nixon" to look to his labels and the packing of the powders. Is there any other work being done in the same room where blue is being used? Is there any liquid used to clean out the boilers that would have any effect on any of the vats or materials being

used? Examine the vats and see that the lining is all right. Look at the water and steam and also the mixing of the peroxide in the bath. If a blue is used after the bleach, the trouble may arise there, for there are blues that will spot the goods, no matter how much care is taken. Delco.

I have read with interest the replies to the question ("Nixon" 2427) regarding blue spots on knit goods, and take this opportunity of giving a few remedies that overcame this same trouble for me. I had prepared skeins for the knitting room and found when knitted that blue specks would appear on certain parts of the stocking. I started to trace the trouble and found that when the men handled these skeins they rubbed them against their blue overalls, which stained the yarn blue. I have trucks which are used exclusively for bleached goods. It is a bad practice to do the bleaching and dyeing under one roof. All the dye-stuffs are weighed outside. Barton.

We have read with interest the reply to the question from "Nixon" (2427) regarding blue spots on knit goods, which appeared in the February issue. We are interested in this for the reason that we are having the same trouble and have been unable to locate the cause. We note the suggestions made, such as bleaching near blue dyeing tub, using blue

after bleaching, marking the goods with blue crayon, dropping of specks from the floor above, or steam from boilers. We thought that possibly our investigations might be of interest to "Nixon".

We have had special yarn made using all colors of soft crayons that the cotton mill uses in marking the roving, that is, we used a lot of it in spinning a number of cops and found that they practically all bleached out, and those that did not were not marked with the blue color which was giving us trouble.

We use no blue whatever in our process of bleaching, either before or after. We use no blue of any shade in our plant, the only colors we manufacture being bleached white and stained Egyptian goods. Our bleach house is entirely separate from the dye house. We have placed on samples of cloth all the different colors that we use in making Egyptian, have stained our cloth with oil used on the machines, oiled the machine so that it would run a lot of dirty grease onto the cloth. In fact we applied everything that could or could not come in contact with the cloth in process of manufacture, but none of them produced the blue color.

Our vats are made of wood and heated with a lead coil, the solution coming in contact with nothing except wood or lead. The steam in the boiler does not escape into the liquor, the coil being continuous and tight. The water

used in mixing the peroxide solution is all filtered through a Hungerford & Terry filter. The graphite pencils used in marking the end of the rolls do not produce the blue color.

We have come to the conclusion that this blue must get into the yarn before we receive it. The mill manufacturing the yarn has taken cotton from the bale and kept it separate in the various processes, watching closely every operation to see that it did not get mixed with black flyings, running it when they were not making anything but peeler yarn, yet we still had the blue spots in the goods. We have finally come to the conclusion that the only sure way of eliminating the trouble is to bleach the lime. This removes the spots completely.

We also had trouble with pink spots, as well as blue, but we discovered these were caused by scarlet felt bobbin covers. The scarlet flyings from the bobbin covers would be carried by the yarn into the cloth, and the color would bleed, causing the pink spots. We took several single fibers, placing them at different points in the cloth and put them in the bleach, laying a piece of cloth on top of it. The scarlet from a single fiber would bleed making a pink spot on the cloth to which it was applied. It would also run into the cloth lying next to it, making two spots. We eliminated the pink, but could not eliminate the

blue. These suggestions may be of some benefit to "Nixon" and save him a number of experiments. Delaware.

Terms Used in Knitting

I would like to have you give an explanation of the following knit goods terms: Swiss rib, Norfolk and shaker knit. Norfolk (2407).

A Swiss ribbed knit garment is slightly different from regular stitch. A special cam is used in the cylinder to hold down more needles than ordinary. This makes the cylinder wales more prominent. In nearly every case needles are left out in front and back for a number of inches. This gives the effect of stripes. There are many so-called Swiss ribbed goods on the market, but not one in five is the real thing. Most people believe that because a garment is a light weight and knit on a fine cut frame with needles left out, it is a Swiss ribbed garment. A knitting machine has to be specially prepared to make it.

I cannot explain the word "Norfolk," unless it is a trade mark or something to distinguish one sweater coat from another. These new names for sweater coat stitches crop up quite often.

"Shaker knit" is derived from the heavy goods knit by hand by the Shakers in New Hampshire, with long bone knitting needles. Later on they were made on circular knitting frames. Shaker knit stands in about the same

class as Swiss ribbed, as far as the real Shaker knit is concerned. Up to a few years ago, I knew of "Shaker knit" goods made in Brooklyn, N. Y., and Philadelphia, Pa. These were made on anything from a hand knitting machine to a twenty-inch circular latch needle machine, cut three needles to the inch. Another case I have in mind was as near the real thing as possible. The goods were made in a sweater shop in a New Jersey city and all knit by hand, using the long bone needles.

Trenton.

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A Norfolk sweater is one made along the general lines of a Norfolk jacket, namely, with a box pleated and belt effect. The stitch may be changed in various ways to simulate pleats. I do not think there is any particular stitch called "Norfolk," but that the name signifies a combination of stitches that produces the Norfolk effect.

Tyrone.

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The word "Norfolk" is applied to any garment either knitted or woven where the coat contains a pleat on both sides of the coat, back and front, with a belt around the waist. It is not a trade mark, simply a trade name used by both knitters and tailors for garments of this cut. It is worn by men, women and children. There is no such thing as a "Norfolk" stitch in knitting sweaters. When a gar-

ment is made up in this style it makes no difference whether it is a shaker or any other stitch.

Hawick.

Meaning of Knitting Terms and Adjusting Machine for Good Plating

What is the meaning of the term "knitting point"? If the cap of a circular knitting machine was not set in the right position, would this interfere with good plating?

Casma (2447).

The term "knitting point" refers to that point where the completed stitch falls off the needles, or in other words, the cast off. The dial and cylinder do not cast off together; the cylinder stitch is formed and released before the dial stitch is cast off.

The dial cap of a circular frame must be in an almost exact position for perfect plating. There are several styles of frames that use a longer dial stitch cam, thereby holding the dial stitches with latches open until the cylinder stitch has released. Let the dial run as far back as possible without dropping stitches. There are many helps, such as tension on yarn, location of hole in yarn guide for back thread, position of yarn guide, smooth needles and many others. Try a colored yarn if using all white to show up the poor plating.

Trenton.

The Scrooping of Hosiery

BY HERTFORD

There have been a number of methods suggested for imparting a scroop or silk-like crunch to dyed hosiery, more especially when this hosiery is made up of mercerized cotton yarns. The scrooping process is carried out as a subsequent operation to that of dyeing, and is in reality a final process of finishing. The methods which have generally been suggested are those involving the use of various organic acids such as acetic, lactic, tartaric and formic. In fact, almost any acid acting on the cotton fiber and allowed to dry will produce a silk-like crunch to the material. In the case of the stronger mineral acids, such as sulphuric, hydrochloric and nitric, the action extends too far and although a very decided silk-like crunch is developed, the cellulose of the fiber is attacked to such an extent as to cause chemical disintegration, resulting in the tendering or complete destruction of the cotton material.

The organic acids mentioned above do not have the same deleterious effect in tendering the cotton fiber, but if used alone they also do not produce sufficient scroop to make the process really worth while. If, however, the organic acids are employed in connection with a soap bath, it has been found possible to produce quite a satisfactory scroop without apparent injury to the strength of the fiber. The

cause of the scroop produced on cotton by this action of acids is probably a certain hardening of the surface of the fiber so that when it is bent it produces a crackling or crunching sound. This hardening may be enhanced sometimes by the use of a little glue or starch solution in connection with the acid and soap treatment, though these substances are also liable to stiffen the material. In cases where such a stiffening effect is not desired, their uses would not be possible.

The character of the yarn also has considerable to do with the degree of scroop which can be produced by chemical treatment. Mercerized yarn can be scrooped to a greater degree and with more readiness than unmercerized. Soft single ply unmercerized yarn can hardly be scrooped at all, whereas hard twisted and lisle unmercerized yarns can be given a fair amount of scroop. The degree of scroop is also influenced by the heat used in the drying of the material. It is well to dry as hot and as quickly as possible, as these conditions will tend to harden the surface of the fiber to a greater degree and thus produce a more pronounced scrooping effect. A number of recipes for cotton, more especially mercerized cotton, have been suggested and the following includes some of these:

(1) The dyed goods are passed through a soap bath containing 1 oz. of hard soap per gallon. The goods should be worked in this

soap solution until thoroughly impregnated and at the temperature of about 140° F. The goods are then removed and the excess of liquor is either squeezed out or the goods are placed in a hydroextractor and then without rinsing worked in a second bath containing 2 1/2 ozs. of lactic acid and 3 ozs. of caustic soda per gallon. The goods are worked in this bath for 20 minutes at a temperature of 140° F. and then hydroextracted and dried without rinsing.

(2) The soaping of the material is carried out as above described, but the second bath consists of 1 oz. of formic acid per gallon, the material being worked therein for 20 minutes at the room temperature and then hydroextracted and dried without rinsing.

(3) It is claimed that a permanent and pronounced scroop can be given to cotton by treating the material with a soap bath as above described and then giving a cold bath containing 1 oz. of tartaric acid per gallon, removing the goods after 15 minutes, hydroextracting and drying without rinsing. A greater scrooping effect can be produced if sizing materials are added to the acid bath which may then contain 1 oz. of tartaric acid, 1/6 oz. of glue and 1/5 oz. potato starch. It is said that the effect can be still further enhanced by treating the goods first with 2 to 3 per cent. of tannic acid and 1 to 1 1/2 per cent. of antimony salt and then soaping and treating with tartaric acid as just described.

(4) According to a German Patent 242933, mercerized cottons may be scrooped in the following manner. The goods are first soaped as usual, squeezed out or slightly rinsed, and then treated in one of the following four baths, after which they are wrung out or hydroextracted and dried without rinsing.

(a) 2 1/2 ozs. of lactic acid and 1 oz. of soda ash per gallon.

(b) 1 oz. of lactic acid and 2 ozs. of sodium lactate per gallon.

(c) 3 ozs. of tartaric acid and 2 ozs. of soda ash per gallon.

(d) 1 oz. of tartaric acid and 1/2 oz. of sodium tartrate per gallon.

In case the goods have been dyed with sulphur dyes, it is said that this process not only gives a distinct scroop but also protects the dyed material from subsequent tendering.

(5) Another process which has been suggested for the scrooping of dyed cotton material is to work in successive baths of calcium acetate, soap and acetic acid in the following general manner. Run the goods for 15 minutes at 110° F. in a solution of calcium acetate of 7.9° Tw. Squeeze lightly but do not rinse. Then work for 15 minutes at 120° to 140° F. in a bath containing 40 per cent. of soap on the weight of the goods. Again squeeze lightly or hydroextract and pass into a cold bath containing one part of acetic acid to 10 parts of water. Finally squeeze and dry without rinsing.

(6) Another process which has been suggested is the use of boric acid in the following manner:

One hundred pounds of the cotton goods are worked in a bath containing 16 to 20 pounds of boric acid for 1/2 hour at 70° F. The goods are then hydroextracted and dried without rinsing or the effect can be enhanced by using two baths as follows: First, working the material in a solution containing 1 1/2 ozs. of soap per gallon, hydroextracting and second passing into a bath containing 1 1/2 ozs. of boric acid per gallon, then hydroextracting and drying without rinsing.

Bleaching and Shrinking Underwear Garments

Is it possible to bleach underwear all made up without the collar and buttons and button-hole stays on? If so, what is the simplest process for cotton and linen? Can underwear be shrunk made up as mentioned above, that is, wool, worsted, cotton and linen, and what would be the simplest process?

Montville (2281).

Underwear can be bleached in shirt lengths sewed across the shoulders and with the sleeves sewed in, but not with the neck cut. If the neck is cut out the bleaching will pull the garment out of shape. I have found the following process to be a good one for cotton and linen: Boil in caustic soda at 2 per cent. for 6 hours, rinse thoroughly after boiling.

Then give the goods a chloride of lime bath at 2° Tw. for one-half hour. Rinse again and then sour with oil of vitriol at 1° Tw. for 15 minutes. Rinse again. Soap in a laundry machine and rinse thoroughly, extract and dry. I have found it more practical to bleach in rolls.

A simple process of shrinking wool, worsted, cotton and linen underwear would be either by steaming or hot water baths. If the goods are to be steamed, an air tight room would be necessary, leaving the goods in the room for three to five minutes with a steam pressure of about ten pounds. If the hot water bath is used, I would advise leaving the goods in the hot bath at 110° F. until thoroughly saturated, then extract and dry.

Mohegan.

Knitting Silk Plated Coats

We want to make up a worsted and silk plated knitted garment that can be brushed and will have the appearance of a silk coat with the desired luster. Can such a coat be made on a five gauge machine, and can it be made with woolen and silk yarns instead of worsted and silk? Also please advise which yarns are best for the purpose and what the cost would be.

Knitter (2479).

A silk plated coat can be made on a five gauge machine, but the result would be a heavy and expensive garment. A five gauge would be almost a jumbo stitch, no matter what cut of cylinder or plate is used. I as-

sume that "Knitter" is using circular machines. If this garment is to be brushed on the outside a soft twist silk should be used and a soft twist means trouble. Fiber silk causes more trouble and waste than natural silk, but it can be made to run. A good grade of woolen yarn should answer as well as worsted. If this coat is to be made with a plain stitch great care should be used in plating, otherwise the silk luster will be lost. On fiber silk more or less tension is generally used to straighten or lay the silk in the right position as it leaves the yarn guides.

I have never heard of brushing such a coat, but that does not mean that it cannot be done. The ordinary brushes would hardly do, even with a soft twist silk. I remember having seen a coat on the market at one time, made from a worsted and fiber silk, with a tuck stitch effect in colors. This was made on a 12-gauge machine, five needles to the inch. The face of this garment was silk and being made with a tuck stitch, every other feed was silk, saving half the silk. All of these garments were made in two colors. With black wool and white silk the silk would show on the face in vertical stripes when slightly stretched. With the plain stitch these stripes would not show. The tuck stitch also gave more weight.

It would be difficult for me to say which yarns are best for the purpose, as I do not know the price or the weight of the garment.

The yarn should, however, be a three-ply, say a 3/34s worsted and a 3/16 silk. Trenton.

A silk plated and brushed coat can be made on a half-cardigan stitch. Use a 1/16s worsted and a 11-end organzine silk. To make the coat from woolen yarn and fiber silk on a 5-gauge machine, it is advisable to use a 24s wool and a 150s fiber. This makes a much better looking garment than using a 16s worsted and 11 end organzine. "Knitter" will find with proper tensions on the fiber silk he can make a much better garment than with organzine silk. I do not mean by this that it is better to use fiber than silk, but I do say that by giving the proper tensions on the machines, which I judge to be flat bed, wood fiber and wool will work very well together and will not have the tearing effect on the garment as do worsted and silk.

Napping or brushing cannot be done on a silk plated garment. Good results can be obtained after the goods are knit by placing them in a cylinder vat or washing machine, adding about 5 gallons of soft soap to 15 gallons of cold water and letting this work for about two hours or until the goods feel spongy. Then remove goods and run them through a dryer. This method gives the appearance of brushing and does not have the tearing effect caused by using the brusher.

One concern making athletic goods and also

cloth for ladies' and gents' suitings both on spring and latch needles is using the above method to obtain the brushed effect. This concern uses 2 wool to 1 silk. The goods after going through this process have a silk luster which cannot be obtained on a brusher.

Taconia.

Preventing Streaks in Light Colored Knit Goods

I enclose a small sample of knit goods which you will notice is streaky in the pink. I have met with this difficulty several times and have not found anything that will take the dirt or streaks out of the yarn without spoiling the color. If you know of any kind of a chemical that will clean woolen, worsted and merino yarn I would like to know of it.

Hunter (2246).

I have had this same difficulty when knitting light colored yarn and have usually found that it is dust which has got on the yarn while being wound, or in bundles which were not properly packed or taken care of in the yarn room. I have never found a remedy for the trouble after the yarn is knit. I have tried bleaching it out in white goods without getting the desired results, and have also tried several solutions for removing the spots, but without success. The only advice I could give would be to see that the yarn is clean when taken from the bundle, that clean hands handle it, and that the winding and knitting machines are clean.

Bristol.

Stains on Knit Goods

We are enclosing a piece of knit goods showing brown stains. These stains get on the goods for only one or two pieces directly on the top in the kier. The kier has outside vomit pipes which connect to a perforated pipe in top inside, which distributes the liquor over the goods. We use a solution of 22 lbs. caustic soda, 15 lbs. concentrated ash and 10 lbs. chip soap to boil 1,400 lbs. goods for 7 1/2 hours. We rinse our goods twice with fresh water from the top. Please advise what is the cause of these spots and what to do to prevent them.

Croydon (2242).

The stains on the samples submitted may be caused by soap chips being cut in the boiling process and the residue of fat and dirt percolating through the blow pipe, leaving the sediment on the goods on the top of the kier. This is one cause of the stains. Another possible cause is dirty kiers, and not too clean water, with possibly dirty boilers. This is indicated by the fact that the stains appear only on the top of the kier. I had the same trouble a few years ago in a piece bleaching plant.

I would advise "Croydon" to watch each kier as it comes out, and to use the following method: First, whitewash the kiers with a strong solution of lime wash. This should be repeated after every boiling if the stains keep appearing. Second, cut out the soap chips, increase the caustic soda to 25 pounds, the soda ash to 20 pounds and boil the same length of time. If the goods come out harsh, make a

solution of soap liquor and pass the goods through the machine with about 20 pounds of solution to 100 gallons of water, adding a little blueing to heighten the white. This will give the goods a softer feel than if they were boiled with the soap chips. Third, see that the goods are covered with burlap or sacking in the kier and properly weighted to hold the sacking down. Fourth, if any compound is to be used in the boilers, or any chemical for purifying the water, see if the quantity can be reduced to help keep down the scum in the boiling. If the above directions are carefully followed I am quite sure all stains will disappear.

Dulcimer.

Hosiery Boards

Please give us what you consider to be the best treatment of hosiery boards for use in the Philadelphia Drying Machine Co.'s dryer on ladies' seamless silk hose. We are troubled with "clouds" or spots in the silk.

Fairmont (2319).

In the first place we would suggest that "Manufacturer" dry the goods at a lower temperature than at present. He must do this by partly closing the valve which admits the steam to the heating coil of the dryer. If he finds that the low pressure steam gives him the desired results in drying he might put a reducing valve in his steam supply line, so that it would only be possible for the dryer to get

a steam supply at the pressure which has been found to give the best results. It might also be well for him to see whether or not too much softener has been used in the dyeing and finishing of the hosiery.

We manufacture a great many boards for various hosiery concerns and when these boards are to be used for silk goods they are given a special treatment. This includes singeing, treatment with our special preparation, handling on special machinery and afterwards hand finishing. This results in a particularly high class board which is very smooth.—Philadelphia Drying Machinery Co.

Uneven Knit Goods

I am sending you with this inquiry a sample of our knit goods bleached in the roll. By holding it up to the light you will notice that while the wale runs perfectly straight lengthways of the rolls, the rows of stitches are twisted out of shape so as to occupy a diagonal position. The goods are knit on a 16, 17, 18, 19 and 20 inch machine, 14 cut, and the goods are defective from all of them. These goods are apparently all right so far as this defect is concerned when they come from the knitting machine, but the imperfection shows up in the cutting room after the goods are bleached. We use horizontal pipes for drying the goods. While it looks as if the trouble was caused in the bleaching process, still we would like to have the subject investigated thoroughly and get the opinions of knitters as to the cause and remedy.

Haraba (2438).

It is evident from an examination of the sample of knit goods submitted, that the trouble arises in drying after bleaching, and is due primarily to uneven tension exerted on the goods at the moment actual drying takes place. Such a condition may be due to one of several causes: Allowing the goods to feed to the spreader while in a slightly twisted condition, or failing to get an even tension on the first layer placed on the roller: or by "brake ropes" often used to prevent a too free delivery from the drying pipe. While it is impossible to state the exact cause of the trouble, it is very important to avoid stretching the goods unnecessarily. Where any tension whatever is exerted on the goods it should be maintained uniformly.

Weybosset.

I do not see how the uneven knit goods can be caused in the bleaching process, unless the goods are unrolled and handled very roughly. I am firmly convinced the defect is caused by pulling the goods over the horizontal piping for the purpose of drying. "Haraba" will notice in drawing the goods off the roll over the piping that the two sides have a tendency to pull tight, leaving the center of the material in a baggy condition. This would naturally cause uneven goods. He should examine the first pipe or probably a few of the front pipes which the goods strike first when they are in a wet condition to see if there is a roughness

that would tend to increase this drag and draw the goods out of shape. This is liable to happen if there is considerable tension as the cloth is stripped from the roll.

The tension will be increased if there is any resin used in the bleaching solution or if the bleaching soap contains resin, which makes goods rough while they are in a wet state. When they are pulled over the horizontal pipes this roughness causes the goods to pull. To overcome this drag rub the pipes with an oily cloth, with not too much oil on it, as the goods are pulled over the pipes. This will ease the drag. If this does not remedy the difficulty put a brass sleeve over the pipes to work loose so that it will turn around with the pulling of the material. Keep a watch on the goods to see if this drag is the cause of the trouble. If this does not overcome the difficulty I would advise installing a different dryer. I would also advise using a wire when commencing to pull the goods over the pipes, threading the wire through both sides of the goods. This will help to prevent one lap dragging before the other. Use a brass or strong copper wire for this purpose, but brass is preferred.

Dulcimer.

The slant in the sample submitted is no doubt caused in the process of bleaching. "Haraba" does not state the kind of machinery used in bleaching, so that it is difficult to

state where the trouble arises. I have come to the conclusion, however, that there is too much tension and drag on the guides. Rolling the cloth thicker on one side than on the other would cause it to twist out of shape.

Mohegan.

Knitting Heavy Yarn and Making Good Elastic Fabric

What is the heaviest yarn that can be knit on a 10-cut rib machine to good advantage, with 36-gauge needles and 24-gauge hook for cylinder and regular 36-gauge dial needles? I am trying to run 10 1/2 yarn and the goods appear full of holes. Can you suggest a remedy? I would also like to have you advise me as to the best way to set a knitting machine to get a good elastic fabric.

Saxon (2443).

The heaviest yarn that can be run on a 10 cut frame successfully, depends on how tight the goods are to be knit. The sample enclosed with the gauge of needles used and number of yarn, should run well, provided good yarn is used. Still a No. 12 yarn might do as well and run without trouble.

The hole in the sample is caused by a knot, which shows that the knots are either too large or the hooks too small, or perhaps the yarn is poor. Try a flat knot. If "Saxon" does not wind his own yarn, catch the big knots in the stop motion strippers. Try the knots to see if they will slide through the

hooks freely. If not, change the hooks. The sample shows either a long stitch or that the cam is holding down too many needles; the dial needles seem to pull back too far, as the distance between wales shows. The wales ought to be close together for that cut and yarn.

In order to get a good elastic fabric run the dial as low as possible and make the stitch and all changes with cylinder needles. Let the dial cap run as far back as possible so that the cylinder stitch will be formed and released before the dial stitch casts off. On the style of frame mentioned the dial should cast off about five needles after the cylinder needles release.

Trenton.

It is my opinion that the hole in the sample of knit goods submitted was caused by a knot in the yarn. The range of yarns that can properly be knit on a 10 cut, latch needle rib frame, runs from a single 10s to 18s. I enclose sample swatch of 10s carded and 12s combed knit on a 10 cut frame with good results. We use 24 hook needle in the cylinder and 36 hook needle in the dial, 36 gauge needles.

Caliatura.

Sizing Compound for Silk Yarn

Can you send me a formula for sizing or otherwise treating silk yarn to facilitate the knitting of the same.

Tokio (1270).

It is presumably spun silk-waste yarn to which the inquiry refers. Any treatment of the kind is unheard of in England where the whole object of all parties concerned is to produce for knitting purposes the fullest, bulkiest yarn possible. Consequently it is difficult to understand what the inquirer would be at. Supposing him to want a soluble form of starch which can be easily applied and easily dissolved out after knitting, a silk man of great experience suggests rice water; the same that is used to hold together raw silks in the East; the least adhesive of starches. A finisher with more claim to know starches and less to know silks, suggests hard-boiled dextrin; partly because it would assist to give the goods the "scroop" which some customers demand. Without more knowledge of the inquirer's circumstances and intention it is hardly possible to give more information either as to the composition or the machines.

Argus.

Mill Wrinkles in Knit Goods

In fulling knit cloth we are having some difficulty because of the roping of the pieces. The goods stick together, although we open them while in the wet stage. We find that the crease caused by roping remains in the cloth after it is dried and finished. Is there some method to prevent the roping in the fulling mill, or to remove the crease after the cloth is finished? For soaping purposes we use a

box on top of the fulling mill with a faucet directly above the solid roll. In front of the rolls the soap runs on the cloth from a $3/4$ -inch outlet in an even stream which gives the goods uniform soaping. We use one pound of soap to each gallon of water boiled $2\ 1/2$ to 3 hours, when the soap is entirely dissolved. Of this solution we use 3 quarts to each $6\ 1/2$ or 7 pounds of cloth. When soaping, we have the trap up, running this way from 10 to 15 minutes. By this time all the soap has run down on the cloth. After this we lower the trap and put on the required weights and then begin fulling. Running this way for $1/2$ hour, the roping begins and here also is where our difficulty begins. Dexter (2409).

A knit fabric suitable for men's wear to be fulled in a rotary fulling mill would have to be very carefully handled to prevent wrinkles. Its being woven in tubular form would cause it to rope and if the goods were run for some time wrinkles would be sure to show when finished. Ordinary woolen goods that have a tendency to wrinkle or rope are best fulled in the rotary fulling mill and fulling stocks. The fulling stocks are extensively used in England and Scotland and I know of no better method of preventing mill wrinkles than frequently shaking the goods out and fulling alternately in the rotary mill and stocks.

In fulling a fabric like the sample submitted, I should first soap down as stated, and run for only half the time required for the full amount of fulling. I would then shake out and fold the pieces neatly and place them in

the fulling stocks, so that the feet kick across the wrinkles, or in a woven fabric across the warp. Folding the goods placed in the stocks would have a tendency to shrink them lengthways, probably as much as in the rotary mill. In fulling in the stocks the goods are on view during the whole process and can be readily examined without stopping the machine or drawing the goods out.

In the woolen and worsted trade there are a few processes and machines for removing or covering up mill wrinkles, but the fulling stocks are the best prevention that I have found during thirty years in the finishing of woolen goods. Why stocks are not more extensively used in the American trade I cannot understand.

There are very few English mills that have not got one or more of these machines. It was once my privilege to be shown over a finishing plant that had eighty-five of these machines installed all of modern make, the feet kicking somewhere around 120 to the minute and turning out fine work upon all kinds of goods. I see no reason why a fabric such as this sample could not be turned out of these machines in perfect condition. Pinetree.

Fuzziness on Silk Hose

We are enclosing two socks. One is new, while the other has been worn and washed once. Could you explain the reason for the fuzziness on these socks? Agram (2384).

The fuzziness on the silk stocking is caused by using a strong alkali in the boiling-off process before dyeing and knitting, which causes the fibers to open up too much, giving a fuzzy and specky appearance which is covered up somewhat in the dyeing process. The best way to boil off silk is to use a good soap and water, or better still, the soap foam degumming process. Silk hose should be washed carefully. The best way to wash such goods is to use an olive oil in cold suds, rinsing in clean water in which a small quantity of salt or vinegar has been added. This acts as a mordant. Wring as flat as possible, let dry in the shade and then press cold. A strong alkali, such as potash or chloride of lime has been used in washing the stockings. This has turned the color and injured the fiber, causing a fuzzy appearance. Lithonia.

Sizes of Boys' Underwear

Kindly give us the standard sizes for boys' flat wool shirts and drawers.

Quebec (2292).

A standard scale of measurements for boys' flat wool shirts and drawers was adopted by the Wholesale Dry Goods Association some time ago. We find, however, that in actual practice some of these proportions were not altogether satisfactory. We have from time to time made slight changes in the scale and are asking our manufacturers to make our

goods according to the following dimensions which have proved to be most satisfactory:

Boys' Flat Wool Underwear—Shirts

Sizes	Width	Length	Length Sleeve
24	12	19	13
26	13	21	14
28	14	23	15
30	15	25	16
32	16	27	17
34	17	29	18

Drawers

Sizes	Inseam	Back Rise	Front Rise
24	19	12½	10
26	21	13	10½
28	23	13½	11
30	25	14	12
32	27	15	12½
34	29	16	13

Men's Flat Underwear—Shirts

Sizes	Width	Length	Length Sleeve
34	17	30	19
36	18	31	20
38	19	32	21
40	20	32	22
42	21	33	22
44	22	33	23
46	23	33	23

Drawers

Sizes	Inseam	Back Rise	Front Rise
30	29	15	13
32	29	15	13

34	.....	30	.....	16	.....	14
36	.....	30	.....	16	.....	14
38	.....	30	.....	17	.....	14
40	.....	31	.....	17	.....	15
42	.....	31	.....	18	.....	15
44	.....	31	.....	18	.....	15

Fillmore.

Standard Sizes for Two-Piece Underwear

Following is the list of standard sizes for two-piece underwear which has been adopted by the Jobbers' Association of Knit Goods Buyers. We are publishing it here in response to numerous inquiries for a standard list of this kind:

Ribbed—Infants'

Size mark—Age	A/0	B/1	C/1½	D/2	E/2½
Neck	..... 9	10	10	11	11
Chest	..... 14	15	16	17	18
Vest length	.. 10	12	13	15	17
Sleeve length	7	8	9	10	11
Arm hole	.... 7	7	8	8	9

Ribbed—Children's

Size mark—Age	2	4	6	8	10	12	14	16
Neck	.....11	12	13	13	14	14	15	15
Chest	.....18	18	19	20	21	22	24	26
Vest length	.....16	18	20	22	24	26	28	30
Sleeve length	.....11	12	13	15	16	17	18	19
Arm hole	..... 9	10	11	12	13	14	15	15
Waist bands	.....23	24	25	26	27	28	29	30
Hip23	24	25	26	27	28	29	30
Thigh11	12	12	13	13	14	15	16

Rise band to crotch

front	7 ²	8	9	9 ²	10	10 ²	11 ²	12 ²
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*Rise band to crotch

back	9 ²	10	11	11 ²	13	13 ²	14 ²	15 ²
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Inseam	13	15	17	20	22	24	26	27
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Trunk	37	40	44	47	51	54	58	61
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Ribbed—Women's

Size mark	34	36	38	40	42	44
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Neck	16	16	17	17	18	18
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Chest	26	28	30	32	34	36
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Vest length	32	32	33	33	34	34
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Sleeve length	20	20	20	20	20	20
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Arm hole	16	16	18	18	20	20
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Waist bands	30	30	30	32	34	36
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Hip	32	34	36	38	40	42
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Thigh	18	19	20	21	22	23
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Front rise	14	14	15	15	16	16
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*Back rise	17	18	19	20	22	22
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Inseam	27	27	27	28	28	28
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Trunk	62	64	66	68	70	72
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Ribbed—Boys'

Size mark—Age	6	8	10	12	14	16
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Neck	13	13	14	14	15	15
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Chest	20	21	21	22	24	26
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Shirt length	20	22	24	26	28	30
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Sleeve length	14	15	16	17	18	19
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Arm hole	11	12	13	14	15	15
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Waist bands	24	25	26	27	28	29
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Hip	24	25	26	27	28	29
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Thigh	10	12	13	14	15	15
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Front rise	9	9	10	11	11	12
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*Back rise	11	12	13	14	15	16
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Inseam	17	20	22	24	27	29
Trunk	44	47	51	54	58	61

Ribbed—Men's

Size mark	34	36	38	40	42	44	46	
Neck	.....	16	16	17	17	18	19	20
Chest	.....	28	29	30	32	34	35	37
Shirt length	.....	32	33	34	34	34	35	35
Sleeve length	.....	20	21	22	22	23	23	23
Arm hole	.....	16	16	16	17	18	19	20
Waist	.....	30	32	34	36	38	40	44
Hip	30	30	31	32	34	35	37	39
Thigh	16	17	18	19	19	20	21	21
Front rise	13	13	13	14	14	14	15	15
*Back rise	17	17	18	19	19	20	20	21
Inseam	31	31	32	32	32	32	32	32
Trunk	62	62	64	66	67	68	69	70

Flat—Children's

Size mark—Age	...	2	4	6	8	10	12	14	16
Neck	.....	11	12	13	13	14	14	15	15
Chest	.....	22	24	24	26	26	28	30	32
Vest length	.....	15	17	19	21	23	25	27	29
Sleeve length	.....	10	11	12	13	15	16	17	18
Arm hole	.....	9	10	11	12	13	14	15	15
Waist bands	.....	23	24	25	26	27	28	29	30
Hip	.....	23	24	25	27	29	32	34	36
Thigh	.....	12	13	14	15	16	17	19	21
Rise band to crotch									
front	.....	7 ²	8	9	9 ²	10	10 ²	11 ²	12 ²
*Rise band to crotch									
back	.....	9 ²	10	11	11 ²	13	13 ²	14 ²	15 ²
Inseam	.....	10	14	16	19	21	23	25	26
Trunk	.....	37	40	44	47	51	54	58	61

Flat—Women's

Size mark	.....34	36	38	40	42	44
Neck	.....16	16	17	17	18	18
Chest	.....34	36	38	40	42	44
Vest length	.....30	30	31	31	32	32
Sleeve length	.....19	19	19	19	19	19
Arm hole	.....16	16	18	18	20	20
Waist bands	.....30	30	30	32	34	36
Hip	.....40	42	44	47	50	53
Thigh	.....23	24	25	26	27	28
Front rise	.....14	14	15	15	16	16
*Back rise	.....17	18	19	20	22	22
Inseam	.....26	26	26	27	27	27
Trunk	.....62	64	66	68	70	72

Flat—Boys'

Size mark—Age	..... 6	8	10	12	14	16
Neck	.....13	13	14	14	15	15
Chest	.....24	26	26	28	30	32
Shirt length	.....19	21	23	25	27	29
Sleeve length	.....13	14	15	16	17	18
Arm hole	.....11	12	13	14	15	15
Waist bands	.....24	25	26	27	28	29
Hip	.....24	26	28	30	32	34
Thigh	.....14	15	16	17	18	19
Front rise	..... 9	9	10	11	11	12
*Back rise	.....11	12	13	14	15	16
Inseam	.....16	19	21	23	26	28
Trunk	.....44	47	51	54	58	61

Flat—Men's

Size mark	.....34	36	38	40	42	44	46
Neck	.....16	16	17	17	18	19	20
Chest	.....34	36	38	40	42	44	46

Shirt length	.....	31	32	33	33	33	34	34
Sleeve length	.....	19	20	21	21	22	22	22
Arm hole	.....	16	16	16	17	18	19	20
Waist	.....	30	32	34	36	38	40	44
Hip	.....	36	37	38	40	42	44	48
Thigh	.....	20	21	22	23	24	25	26
Front rise	.....	13	13	13	14	14	14	15
*Back rise	.....	17	17	18	19	19	20	21
Inseam	.....	30	30	31	31	31	31	31
Trunk	.....	62	64	66	67	68	69	70

*Where the front and backs of pants are made alike they must both be the length of the back rise as here given, and not one-half the sum of the front and back.

Sizes on the rib scale are based on 1 by 1 stitch goods of winter weight and a stretch of 25 per cent. in width is allowed. This allowance may be increased up to 30 per cent. as the goods run lighter in weight, or decreased with more rigid fabrics.

"Waist band" is measurement of garment when buttoned.

Sweater Coat Sizes

A committee of the Jobbers' Association of Knit Fabric Buyers' which has been investigating the question of standardizing sweater coat sizes, made a report at the recent meeting of the association in New York, and recommended that the following sizes be adopted by the trade:

Men's Sweater Coats

Chest Inches	Width Inches	Length Inches	Sleeve Inches
34	15½	26	20
36	16½	27	20
38	17½	28	21
40	18½	28	21
42	19½	28	21
44	20½	29	22
46	21½	29	22

Boys' Sweater Coats

Chest Inches	Width Inches	Length Inches	Sleeve Inches
24	11	18	13
26	12	19	15
28	13	20	16
30	14	21	17
32	15	22	18
34	16	24	19

Sizes of Balbriggan Union Suits

Please give us the latest scale of sizes for men's flat balbriggan union suits.

Wilton (2215).

I enclose the correct measurements for men's flat balbriggan combination suits. It will be noticed that I have given the scale of lengths for the three-quarter length suit, as I find that during the present season a very large proportion of the business has been done

on this length garment, the end of the cuffs of which is supposed to reach to the bottom of the cuff of the sock. I have also given measurements for short sleeves and the same applies to the top of the sleeve.

Sizes	Chest	Shoulder to Crotch	Inseam for Ankle Length	Inseam for $\frac{3}{4}$ Length	Long Sleeves	Short Sleeves
34	17	30	26	21	17	8
36	18	31	27	22	18	8
38	19	32	28	23	19	8
40	20	33	29	24	20	9
42	21	34	29	24	21	9
44	22	34½	30	25	21	9
46	23	35	30	25	21	10
48	24	35½	30	25	22	10
50	25	36	30	25	22	10

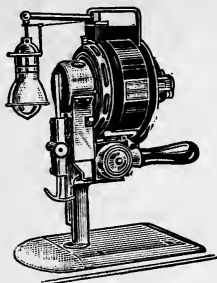
As "Wilton" will undoubtedly put in a set-in sleeve in his garment, the bottom will measure some two inches less or as much less as the sleeve is set in at the top. Filmore.

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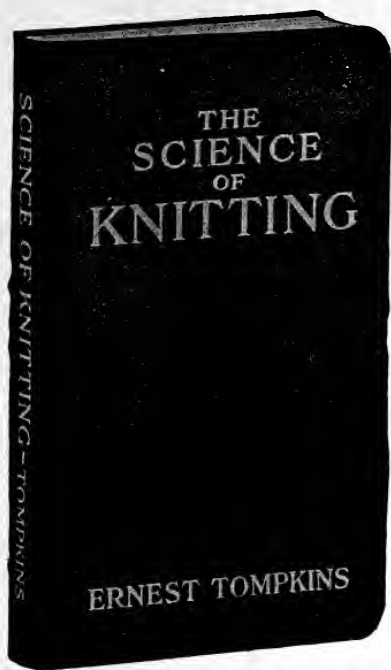
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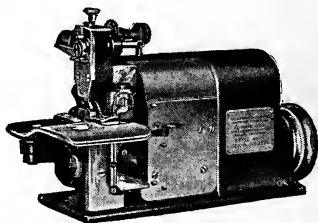
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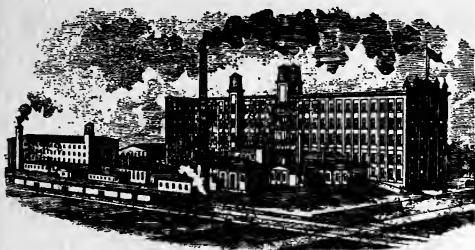
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